Hallwood Park School and Nursery

CALCULATION POLICY

2014-2015

V1

Hallwood Park Primary School Mathematics Calculation Policy

This progression aims to show the different methods that the children at Hallwood Park Primary School should be using for addition, subtraction, multiplication and division. The methods given are indicators for teachers but professional judgement should be used for children working at either a higher or lower level. The main aim is that all children are securely using the method shown for their year group by the end of that academic year.

The main aim for children in Key Stage 1 is to secure mental strategies for each operation so they are ready to progress onto formal written method in Key Stage 2. It is expected that both Key Stages teach mental strategies and build upon prior learning. It is essential that all staff use AfL to fill in any gaps in learning which may prevent children making progress.

Different methods and strategies are taught to the children so that they have thorough understanding of what they are doing and that each method will build upon the previous one. Wherever possible, children will be given practical equipment and visual aids to support their learning.

When numbers get larger or move into decimals, children may need to refer to a previous method to support understanding.

Addition

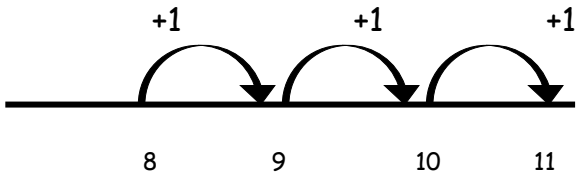
Reception to Year 2

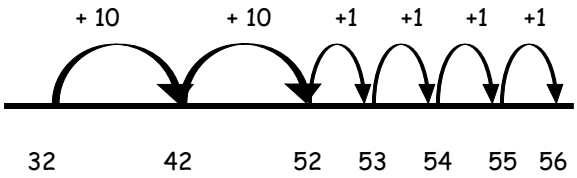
<table>
<tr>
<td>Counting sets of objects
  =3

Combining two sets of objects into one group to find total.
2 + 3 =
 

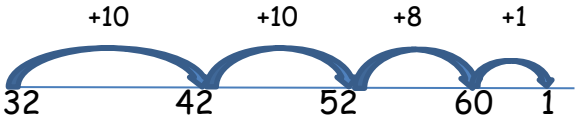
At a party, I eat 5 cakes and my friend eats 3.
How many cakes did we eat altogether?
 

7 people are on the bus. 4 more get on at the next stop. How many people are on the bus now?
  </td>
<td>Working practically or drawing a picture helps children to visualise the problem.

Children are encouraged to progress towards using dots or marks.</td>
</tr>
<tr>
<td>Counting forwards
8 + 3
 

What is 32 + 24?
 
</td>
<td>Children can count up using an empty number line. This is a really good way for them to record the steps they have taken.

They are encouraged to use the most efficient method to solve a given calculation, therefore you may see children putting the largest number first or partitioning a number into tens and ones</td>
</tr>
</table>

What is 32 + 29?  	Children then progress onto crossing a tens boundary. They will also have to use partitioning when counting on. All of these methods need to be taught using practical equipment first eg with bundles of straws, dienes, counters etc before the children move onto formally recording their work. Only once they are secure should they begin recording using the above methods.

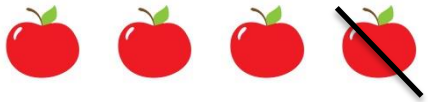
Progression from Year 3 to Year 6

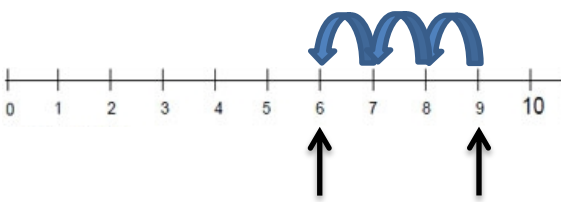
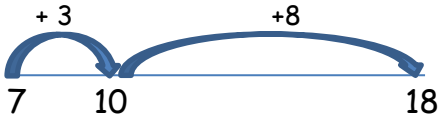
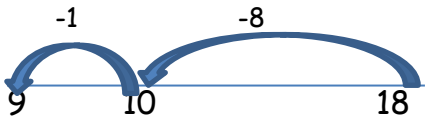
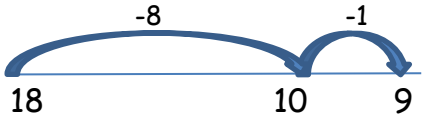
43 + 26 = 40 + 3 20 + 6 60 + 9 = 69 67 + 24 = 60 + 7 20 + 4 90 + 1 = 91 10	When introducing this method begin with numbers that do not need to be carried. The children need to be taught from this method to add the units first, then the tens etc. When the children are introduced to carrying they need to partition the number being carried so it can be recorded below the tens. This is to ensure that the children understand what carrying means. The children need to be able to use this method confidently including adding 4 digit and 4 digit numbers.
43 + 26 = 4 3 + 2 6 6 9 67 + 24 =	The final method children should be taught is column addition. Begin without carrying and when children are secure they can be introduced to it.

6 7 + 2 4 9 1 1	Progress children with the numbers they are given, including decimals.

Subtraction

Reception to Year 2

Encourage children to count a group of objects, and then move some away. Recount total.  5 – 2 = I had five balloons. Two burst. How many did I have left?  Take away I spent £7. A teddy bear costs £5 and a doll costs £2. How much more does the bear cost?  Find the difference Lisa has 5 felt tip pens and Tim has 2. How many more does Lisa have? How many less than Lisa does Tim have? ●●●●● ●●	Working practically or using pictures will help children to visualise the problem. Children are encouraged to progress towards using dots or marks.

Count back from a given number using a number line. 9 – 3 = 6 3 less than 9 is 6  18 – 7 = 11  18 – 9 =9   	Children can progress onto using a numberline to support mental calculations as a form of jotting. They need to be able to decide whether to count on or back. This encourages the children to select the most efficient method. Children also need to be able to partition numbers the numbers to support subtraction. The children should also use their knowledge of number facts to partition the number they are taking away to ensure accuracy.

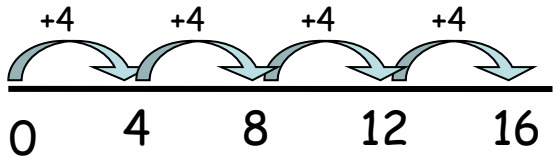
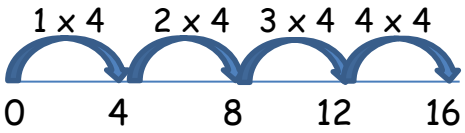
Year 3 to Year 6

58 – 32 = 50 and 8 - 30 and 2 20 and 6 = 26 83 – 38 = 80 and 3 - 30 and 8 70 ~~80~~ and 13 - 30 and 8 40 and 5 = 45 The answer would look like this	Only when children are secure using a numberline for subtraction should they progress onto expanded method. The children need to be taught calculations with and without exchange at the same time so that they have clear understanding of when they need to exchange. Children are to subtract 4 digit from 4 digit numbers.
58 – 32 = 58 -32 26 83 – 38 = 7 1 ~~8~~ 3 -3 8 4 5	The final method is the compact method. Begin without exchanging and then progress onto exchange when the children are secure in the method. When introducing this method do it alongside the expanded method so the children can make the connection. This method is to progress onto using decimals.

Multiplication

Reception to Year 2

0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20	Children are introduced to multiplication by counting on and back in equal steps of ones, twos, fives and tens.
2 x 4 Each child has two feet. How many feet do four children have?  2 + 2 + 2 + 2	Working practically or drawing a picture helps children to visualise the problem. Making common, consistent links between all staff and year group actions for each operation.
6 x 3 There are 6 eggs in a box. How many eggs in 3 boxes? ●●●●●● ●●●●●● ●●●●●● 6 + 6 + 6	Dots or tally marks are often drawn in groups. This shows 3 groups of 6.
4 x 3 3 x 4 ●●●● ●●●● ●●●● ●●● ●●● ●●● ●●●	Drawing an array (3 rows of 4 or 4 rows of 3) gives children an image of the answer. It also helps to develop the understanding that 4 x 3 has the same value as 3 x 4. When drawing arrays the first number is the number across and the second number is the number going down.

4 x 4 There are 4 cats. Each cat has 4 kittens. How many kittens are there altogether?   	Children can count on in equal steps using an empty number line. This shows 4 jumps of 4. The recording on the numberline can then progress onto recording the jumps as multiplication.

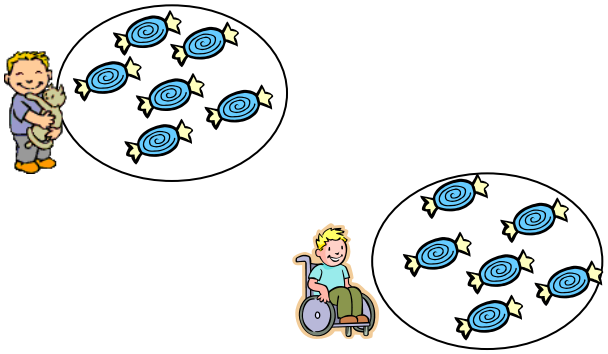
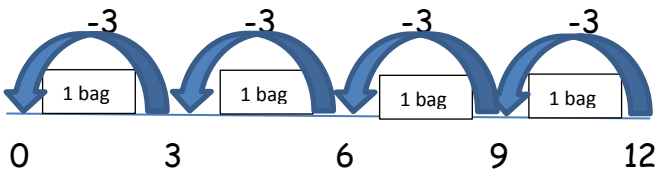
Year 3 to Year 6

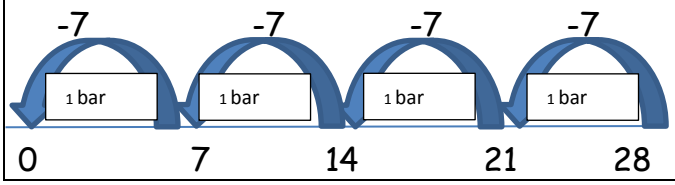
38 x 7 = 38 x 7 = 30 x 7 = 210 8 x 7 = 56 = 266	When children are secure with the above methods they can begin to move onto partitioning to multiply. It is vital that they are also secure with place value so they partition correctly.
38 x 7 = X | 30 | 8 7 | 210 | 56 = 266	When introducing the grid method the children should be taught it alongside the above method. Numbers should be increased to 4 digits multiplied by 4 digits.
3 8 X 7 2 6 6 2 4 X 1 6 1 4 4 (24 x 6) 2 2 4 0 (24 x 10) 3 8 4	Only when children are secure using the grid method should they be introduced to short multiplication. This should be introduced alongside the grid method so children can visually see how they link.

1 2 4 X 2 6 7 4 4 ~~1~~ 2 2 4 8 0 3 2 2 4 1 1	By the end of year 6 children will be expected to do long multiplication including decimals.

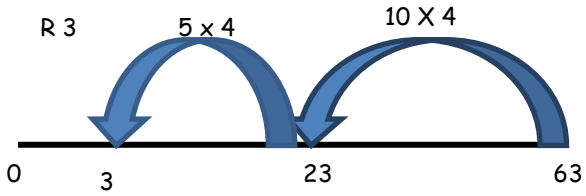
Division

Reception to year 2

There are 12 sweets and 2 children. They share the sweets equally, how many sweets does each child have? Sharing between two  Each child has 6 sweets	Sharing is a skill children come to school with. 'One for me one for you' is repeated subtraction of one. Working practically or drawing a picture helps children to visualise the problem. In this example children 'share' the 12 sweets between the two children until there are none left.
Grouping in threes There are 12 sweets and each party bag needs three sweets. How many party bags can be made?  **There are 4 party bags** 	Children progress to removing 'groups' of a number. In this example children put 'groups of three sweets' into the party bags until they have no sweets left. This must be taught practically first. Children can record the number of bags in the jump and the amount they are taking away above each jump.

Start here 12 ÷ 4= 4 apples are packed in a basket. How many baskets can you fill with 12 apples? ●●●● ●●●● ●●●● 28÷7= A chew bar costs 7p. How many can I buy with 28p?  	Dots or tally marks are often drawn in groups. This shows 3 groups of 4. Children can count back in equal steps using an empty number line to work out how many groups of 7 there are in 28. This shows you need 4 jumps of 7.

Year 3 to Year 6

63 children need to be seated in groups of 4. How many tables will be needed to seat all the children? 63 ÷ 4 = 15 r 3  16 tables will be needed to seat all the children, one will only have 3 seats.	When numbers get bigger, it is inefficient to do lots of small jumps on a number line. Children begin to jump in 'chunks' of the number they are dividing by, in this example 'chunks of 4' are used. A jump of 10 groups of 4 takes away 40. Then you need another 5 groups of 4 to reach 3, leaving a remainder of 3.
12 ÷ 3 = 4 3 | 1 2 162 ÷ 6 =	When the children are secure using chunking on a number line they can be introduced to the compact method. Model this alongside the number line and begin with small numbers without a remainder. When children understand the concept they need to be given larger

$$\begin{array}{r} 27 \\ 6\overline{)162} \\ {\scriptstyle 4} \end{array}$$	numbers and numbers that will leave a remainder.
326 ÷ 18 =	Gradually increase the size of the numbers up to dividing a 4 digit number and decimal number. Some children will need to use informal jottings to support their working out.
$$\begin{array}{r} 18\ r\ 2 \\ 18\overline{)326} \end{array}$$	